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Mechanical properties of woven carbon fiber / kenaf fabric reinforced epoxy matrix hybrid composites (Article)

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Abstract

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The demand for composite materials in manufacturing industries is increasing especially in structural applications due to its outstanding properties , especially in mechanical aspects. Nowadays, the fabrication of hybrid composite has widely developed where the combination of natural and synthetic fibers with a matrix resin gained major interest in many pieces of research. Unfortunately, from previous studies, the research that utilizes the adoption of fine kenaf fiber as a reinforcement using the vacuum infusion as a fabrication technique was limited. Indeed, the mechanical properties of fabricated hybrid composites rely upon the condition of kenaf fiber and also fabrication method. Therefore, to occupy the gap, in the present work, a hybrid composite was fabricated where the combination of two different reinforcements; fine kenaf fiber and carbon fiber were used together with the epoxy matrix via vacuum infusion technique. The fiber contents were varied at 40 and 50 vol.%. The sample of carbon fiber reinforced epoxy matrix and kenaf fiber reinforced epoxy matrix were also fabricated as a reference. The effect of different fibers/ matrix ratio of the hybrid composite was evaluated by conducting tensile and flexural tests according to ASTM D3039 and ASTM D790. The fractures and mode failures of hybrid composites were characterized using scanning electron microscope (SEM) and the optical microscope, respectively. The result highlights that hybrid composite with fiber / matrix ratio of 40/60 vol.% exhibits good tensile and flexural strength in which both values gained at 325.70 MPa and 345.23 MPa, respectively.

SciVal Topic Prominence

Topic: Kenaf Fibers | Sisal | Coir

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Author keywords

Carbon / kenaf fiber | Hybrid composite | Natural fiber | Vacuum infusion (vi)

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